ASUS® AP2400R

Dual Pentium® III 2U Rackmount Server

Reference Guide

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FCC/CDC Statements

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

Safet y Precautions

Safeguards

Observe the following safety precautions when you are connecting or disconnecting any devices.

Operation Safety

> **IMPORTANT**
>
> - Any operation on this server must be conducted by certified or experienced engineers.
> - Before operating your server, carefully read all the manuals included with the server package.
> - Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
> - To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
> - Before opening the chassis panels, make sure all power cables are unplugged.
> - Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.
> - If the power supply is broken, do not try to fix it by yourself. Contact an authorized dealer.
> - It is recommended that you wear gloves when assembling or dissembling the server to protect from cuts and scrapes.
> - When the server is powered on, heat sinks and the surfaces of certain IC devices may be hot. Do not touch them. Check whether the fans are functioning properly.

Tools Required

You need a Philips (cross) screwdriver and a flat screwdriver to install or remove the components in the server.

Safet y Precautions

Electrical Safety

IMPORTANT

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

CAUTION

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

IMPORTANT

Motherboards, adapters, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags to prevent this damage. Take the following precautions:

- If you have an antistatic wrist strap available, use it while handling the device.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.
- Handle the devices carefully to prevent permanent damage.

Contents

Contents

Introduction

You are reading the AP2400R Server Reference Guide. This reference guide provides general and specific information about the AP2400R server.

"About This Guide" contains an introduction on the contents of this document that include target audience, chapter description, and conventions used. It also lists the items included in the system package.

About This Guide

Audience

This guide is intended for experienced users and integrators with hardware knowledge of personal computers.

Contents Description

This reference guide contains the following parts:

1. **Introduction: About This Guide**
   This part contains an introduction on the contents of this document that include target audience, chapter description, and conventions used. It also lists the items included in the system package.

2. **Chapter 1: System Overview**
   This chapter describes the external features of the AP2400R server. It includes specific sections that identify these features.

3. **Chapter 2: Basic Operation**
   This chapter tells how to get started with the AP2400R server. The basic operation includes connecting the cables and powering on the system.

4. **Chapter 3: Hardware Setup**
   This chapter describes the hardware setup procedures that you have to perform when installing system components. It also gives detailed information on the internal components and how to install them.

Conventions

Symbols

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this guide.

WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Information that you MUST follow to complete a task.

NOTE: Tips and information to aid in completing a task.

PHILIPS (CROSS) SCREW DRIVER: A tool required to install or remove the components in the server.

STANDARD (FLAT) SCREW DRIVER: A tool required to install or remove the components in the server.

Package Contents

This section lists the items included in the server package.

If you are assembling the server by yourself, make sure to prepare all the server components before starting. It saves you a lot of time not having to hunt down components when you need them. The following checklist specifies the necessary components for the server.

Standard Components

☑	Motherboard	ASUS CUR-DLSR
☑	Chassis	AR-20 2U Rackmount Chassis (19")
☑	Power Supply	280W Redundant
☑	Floppy Drive	Slim 1.44MB
☑	CD-ROM Drive	ASUS 50x
☑	PCI Expansion	Three 64-bit PCI slots
☑	Cables	Internal SCSI, IDE, floppy
☑	S370 CPU Terminator	For use in one processor configuration
☑	Rackmount Rails	R-20 Rackmount Kit
☑	User's Manuals	server, motherboard, CD-ROM

Optional Components

☐	RAID Controller	ASUS PCI-DA2200 RAID controller
☐	Processor	Dual Pentium® III up to 1GHz
☐	Memory	Up to 4GB registered ECC SDRAM
☐	Hard Drive	Up to six SCA-2 Ultra160 SCSI

Chapter 1

This chapter describes the external features of the AP2400R server. It includes specific sections that identify these features.

System Overview

Features

The AP2400R is configured for the ASUS CUR-DLSR smart motherboard that uses the ServerSet™ chipset from ServerWorks®. The motherboard supports dual Pentium III processors to accelerate even the most complicated server tasks. The following are highlights to the server's many features. For additional information, refer to the motherboard user's manual that comes with the server package.

Chassis: ASUS AR-20

- **Chassis:** 2U form factor that fits in a standard 19" rack

- **SCSI Backplane:** Supports six SCSI hard drives using 80-pin SCA-2 connectors

- **Power:** Redundant (dual) 280W power supplies equipped with two universal AC input and ATX-compliant output cables

- **Device Bays:** Support for one 3.5" slim type floppy device, one 5.25" standard sized CD-ROM drive, and six 3.5" wide/1" high SCA SCSI hard disk drives in swappable trays

Motherboard: ASUS CUR-DLSR

- **Processor:** Dual Intel® Pentium III FC-PGA processors running up to 1GHz

- **Memory:** Four 168-pin DIMM sockets that support up to 4GB PC133 registered SDRAM with ECC support

- **Onboard SCSI:** LSI® 53C1010-33 dual-channel Ultra160 SCSI controller that supports up to 30 SCSI devices using two 68-pin Wide SCSI connectors

- **Onboard LAN:** Dual Intel® 82559 Fast-Ethernet server controllers that supports 10BASE-T and 100BASE-TX, RJ-45 output

- **Onboard VGA:** ATI® Rage XL VGA controller with 4MB PC100 SDRAM

- **Integrated Super I/O:** PC97317 controller that supports one floppy, two serial ports, one printer port, two USB ports, one PS/2 keyboard, and one PS/2 mouse

- **Expansion Slot:** Three 64-bit PCI slots on a riser card for full-length PCI expansion cards
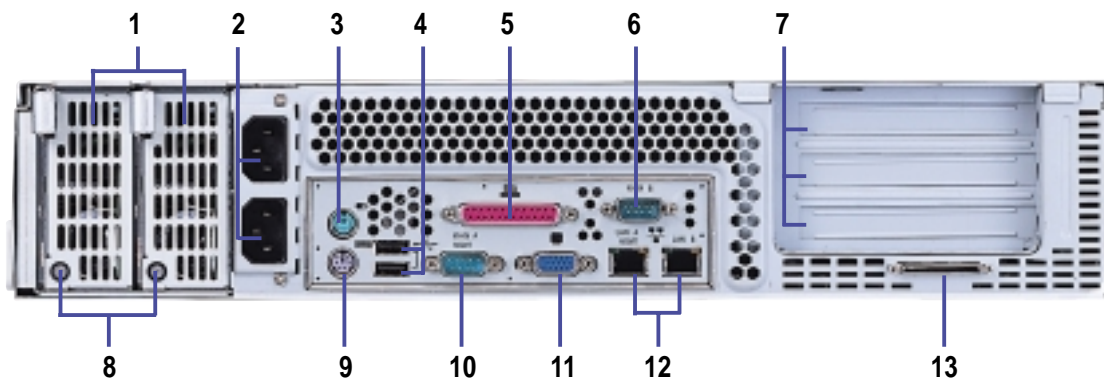
Front Panel

The front panel of the AP2400R server allows easy access to the floppy, CD-ROM, and removable hard disk drives. The power button and the system LED indicators are also located on the front panel (see next page for descriptions).

System LEDs

ID0
ID1
ID2

ID3
ID4
ID5

Hard Drive Bays   **CD-ROM Drive**   **Floppy Drive**   **Hard Drive Bays**
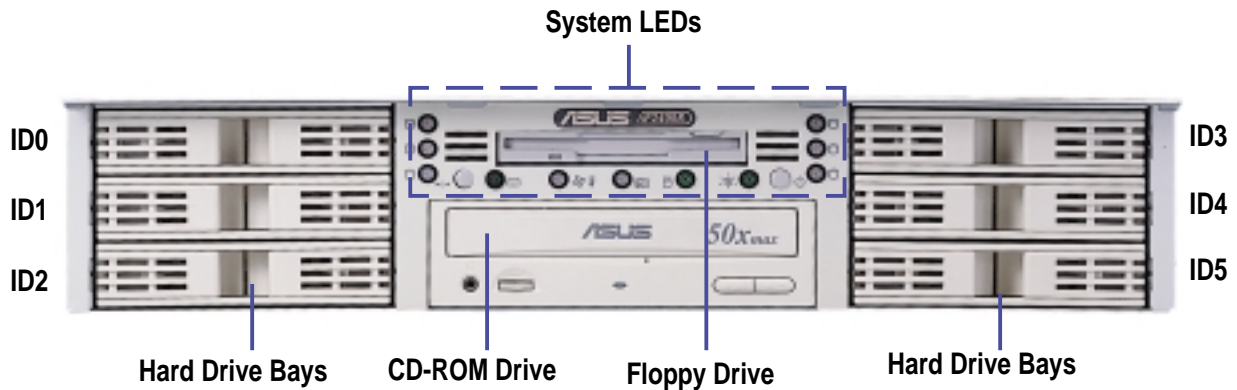
Back Panel

The server back panel is shown here with labels to each part.

1. Redundant Power Supplies
2. Redundant AC-In Connectors
3. PS/2 Mouse Port
4. USB Ports 1 and 2
5. Parallel Port
6. Serial Port (COM2)
7. Three PCI Expansion Slots

8. Power Supply Power LED
9. PS/2 Keyboard Port
10. Serial Port (COM1)
11. Video-Out (VGA) Port
12. LAN Ports 1 & 2 (RJ-45)
13. Very High-Density SCSI Connector

Power Button and System LEDs

The front panel includes system LEDs to indicate fan and thermal status, hard disk status, and system power status.
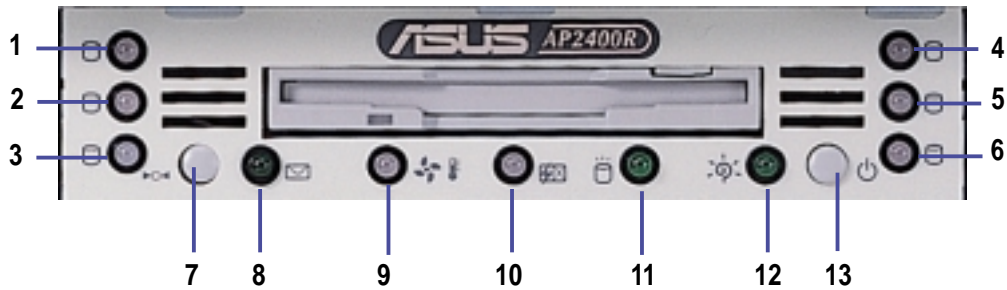
1-3. Hard Drive Power & Status LEDs   10. Power Supply Status & Failure LED
4-6. Hard Drive Power & Status LEDs   11. Hard Disk Activity LED
7.   System Reset Button   12. Power ON LED
8.   Programmable Message LED   13. System Power Button
9.   Fan Fail or High Temperature LED

LED Information

Hard Drive Power & Status LEDs

The SCSI hard drives have individual LEDs. When a hard drive is installed, the specific LED for that hard drive is ON (steady green) under normal conditions. If there is a problem, the LED may turn to a steady amber. These LEDs are unlit when there is no hard drive is present.

System Reset Button

This button resets (reboots) the system in case it does not respond to normal commands.

Programmable Message LED

This LED is software programmable to indicate conditions such a power outage or event warnings.

Fan Fail or High Temperature LED

When fan speeds and temperatures are normal, this LED shows a steady green. This LED turns to steady amber when fan speeds decrease or temperatures increase past a critical threshold.

Power Supply Failure LED

This LED lights when there is a serious problem with the power supply.

Hard Disk Activity LED

This LED flickers (green) whenever there is IDE or SCSI activity. This LED is unlit when there is no disk activity.

Power ON LED

This LED lights up (steady green) when you apply power to the system by pressing the power button. This LED goes off when you turn off the system.

System Power Button

The system power button is connected to the motherboard and is used for turning the system ON or OFF.

Chapter 2

This chapter tells how to get started with the AP2400R server. The basic operation includes connecting the cables and powering on the system.

Basic Operation

Getting Star ted

Before you turn on the server, make sure that you have completed the basic system connections. Follow these steps when starting the server.
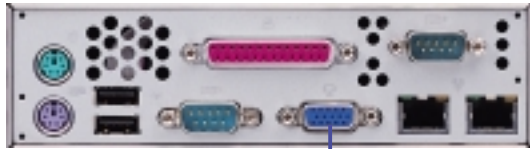
Video-Out (VGA) Port

Connect a Monitor

Connect a VGA-compatible monitor by plugging the 15-pin video cable to the video-out port (blue) on the back of the server.

Redundant Power Supply AC In

Connect Power Cords

Connect two power cords to the AC power connectors on the back of the server, then plug the power cords to a grounded source.

TIP: The utilize the redundancy of the power cords, connect each one to a different source, for example, two separate UPS connected to two separate power sockets.

Power Button

Turn the Power ON

Power ON the server by pressing the power button on the front panel.

Hard Drive Warning (Amber)

Fan/Temp LED   **Power LED**

Check Power LED

After powering on the server, check if the power LED lights up. Also make sure that all warning LEDs are normal.

Chapter 3

This chapter describes the hardware setup procedures that you have to perform when installing system components. It also gives detailed information on the internal components and how to install them.

Hardware Setup

Opening the Chassis Cover

The AP2400R chassis is a 2U form factor designed for easy assembly and disassembly, making the installation of internal components very convenient. At the top of the chassis is a rotating lock that secures the cover to the chassis.

Unlocking the Cover

To unlock the cover, turn the rotating lock clockwise until the triangle mark points to OPEN.

Triangle Mark

Rotating Lock

CLOSE　　**OPEN**

Removing the Cover

Slide the top cover toward the front for about an inch, then lift it from the chassis.

CAUTION

The top cover of the chassis has locking tabs at the rear end that connect to the inner side of the back panel. Make sure to disengage the locking tabs before lifting up the cover.

Under the Chassis Cover

When you open the cover to the AP2400R, you will see several major parts as shown in the second picture below.
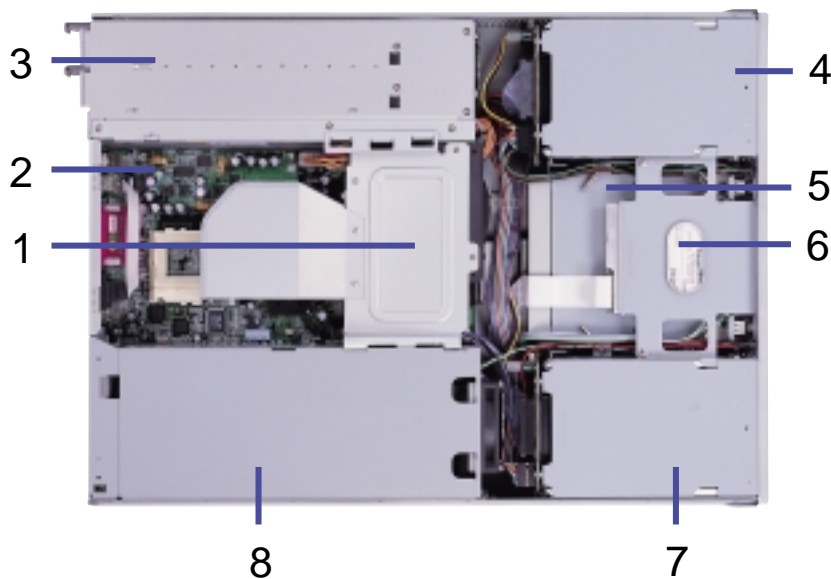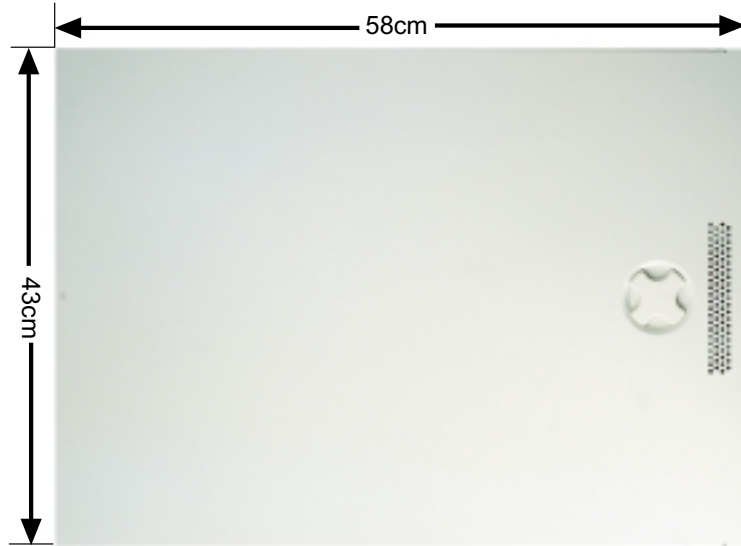
1. CPU Blower
2. CUR-DLSR Motherboard
3. Redundant Power Supplies
4. Three SCA bays
5. CD-ROM Drive (standard 5 1/4")
6. Slim 1.44MB Floppy Drive
7. Three SCA bays
8. PCI Cage

Internal Components

The AP2400R server interior comprise the motherboard and other parts that complete the system.
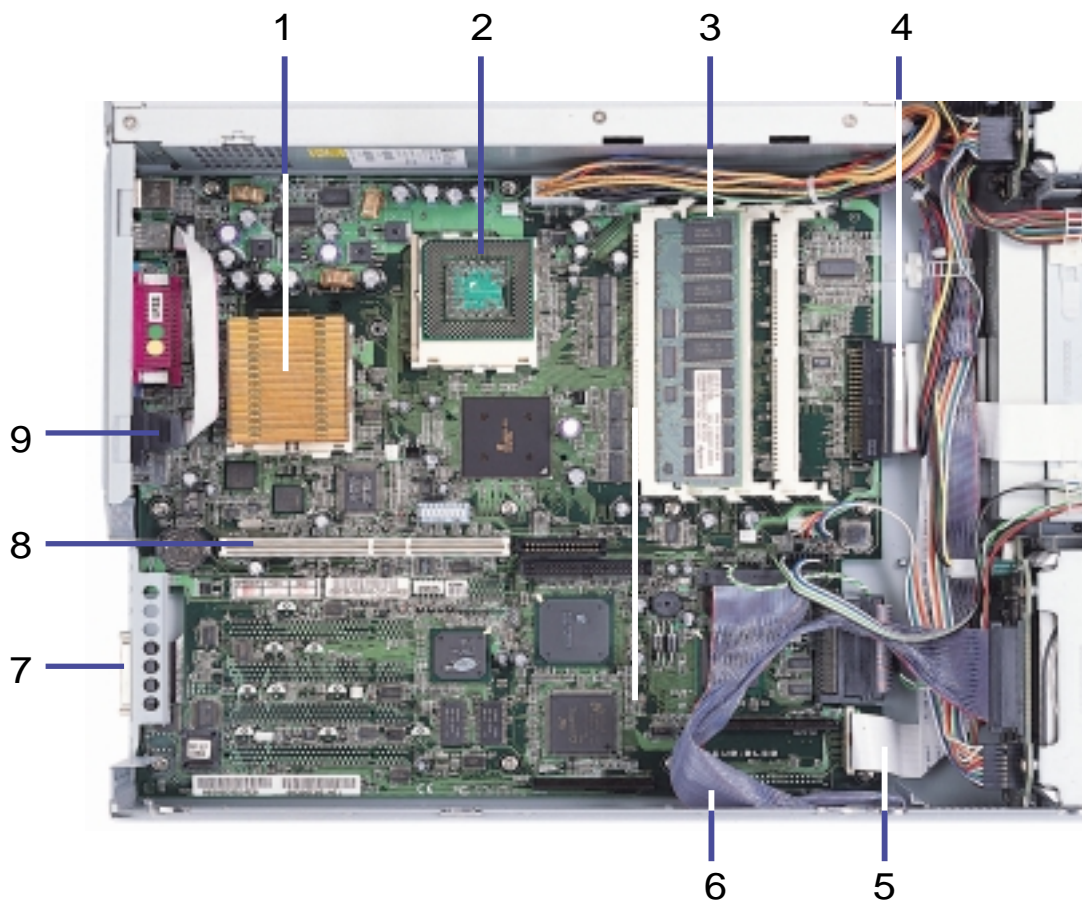
1. CPU Socket 1
2. CPU Socket 2 (for CPU terminator in 1 CPU configuration)
3. Memory Sockets for 1, 2, 3, or 4 DIMMs
4. IDE Connector for standard 5 1/4" CD-ROM Drive
5. Slim Floppy Drive Cable
6. SCSI Cable for Hot Swap SCA SCSI Connectors
7. External Very High Density Connector Interface (VHDCI) SCSI Connector
8. 64-bit PCI Slot for Riser Card
9. COM2 Serial Port

Motherboard Placement

This section tells how the motherboard is placed into the chassis in case you need to remove and reinstall it in the future.

Placement Direction

When installing the motherboard, make sure that you place it into the chassis correctly. The edge with the external ports goes to the back panel of the chassis.

Motherboard ports must align with openings on the chassis.

Back Panel

Motherboard Screws

Place 13 screws in the holes indicated by circles to secure the motherboard to the chassis. Do not overtighten the screws. Doing so may damage the motherboard.
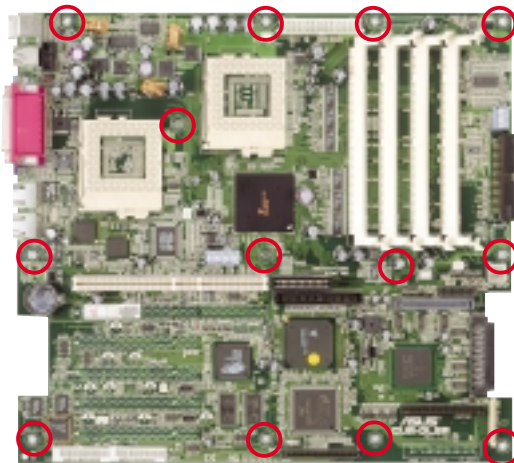
Central Processing Unit (CPU)

CPU Orientation

A CPU has a mark (usually a notch or a gold mark) on one corner to help you identify the proper orientation and enable you to correctly install the CPU. Match the marked corner of the CPU with the marked corner on the socket to avoid damaging the CPU pins.

Gold Mark

CPU Installation

(1) Unlock the socket by pressing the lever sideways then lifting it up to a 90°-100° angle. See Figure 1.
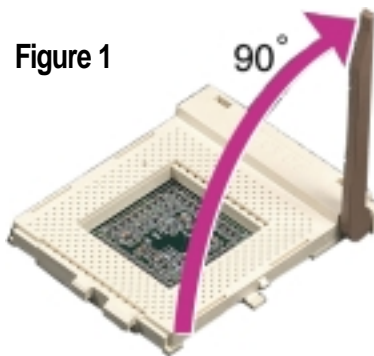
(2) Position the CPU above the socket such that its notched or marked corner matches the socket corner near the end of the lever, while making sure that the CPU is parallel to the socket. See Figure 2.
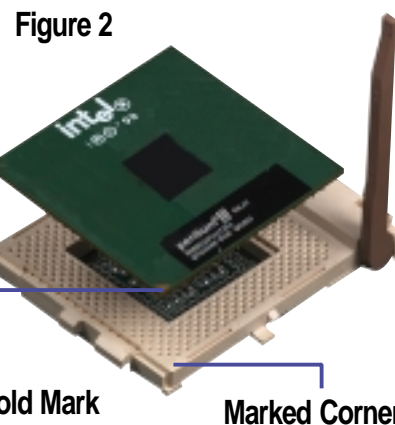
(3) Carefully insert the CPU into the socket until it fits in place.

(4) When the CPU is in place, press it firmly on the socket while you push down the socket lever to secure the CPU. The lever clicks on the socket indicating that it is locked.

Figure 1

Figure 2

Gold Mark   Marked Corner

IMPORTANT

The CPU fits only in one orientation. Do not force the CPU into the socket to prevent bending the pins and damaging the CPU. If the CPU does not fit completely, check its orientation or check for bent pins.

CPU Heatsink

Attaching the Heatsink Front Clip

Place the heatsink on top of the installed CPU. Attach the heatsink front clip to the front of the CPU socket.

(NOTE: When viewed from the front, the CPU socket has the lever on the right side.)
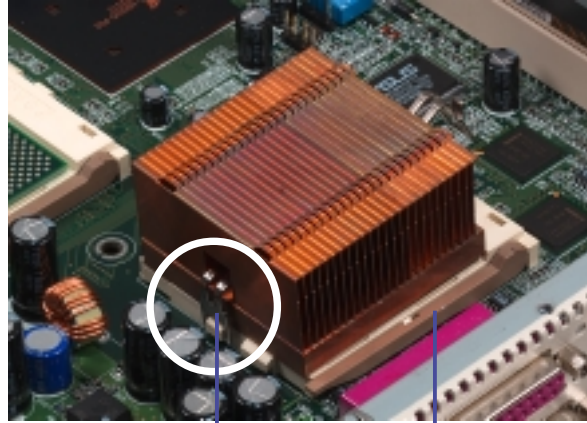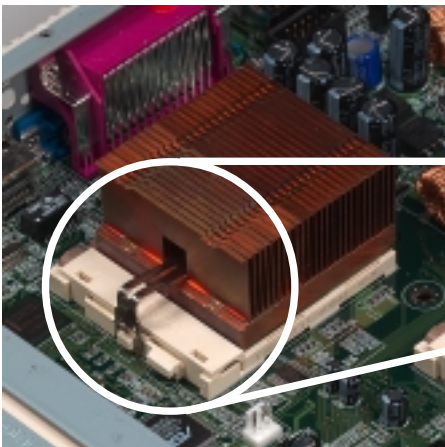

Heatsink Front Clip   **Socket Lever**

Attaching the Heatsink Back Clip

Use a flat screwdriver to attach the back clip to the back of the CPU socket until it snaps in place.
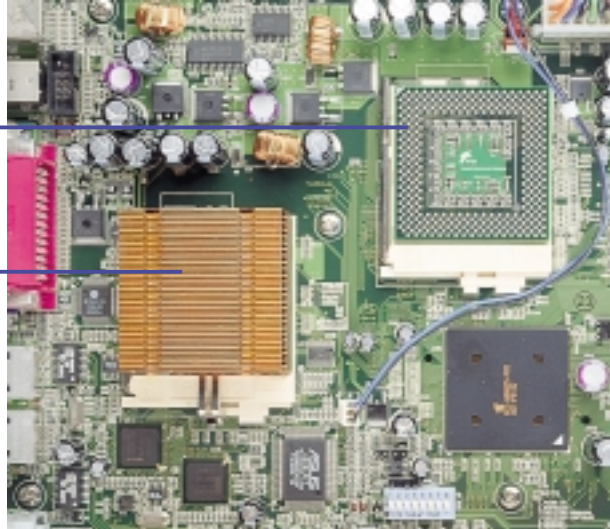
CPU Terminator

CPU Terminator Placement

When using only one processor socket, make sure to install an S370 processor terminator to the unused socket. Install a CPU terminator as you would install a CPU. Refer to the section "CPU Installation".

CPU Socket 2 with Installed Terminator

CPU Socket 1 with Installed CPU and Heatsink

Cooling Fans

CPU Blower

The blower shroud extends to the CPU area on the motherboard. The CPU blower module rests on the PCI cage and power supply with hooks on each side.

Hooks   CPU Blower

Underside of CPU Blower

CPU1   CPU2   Shroud   Hooks
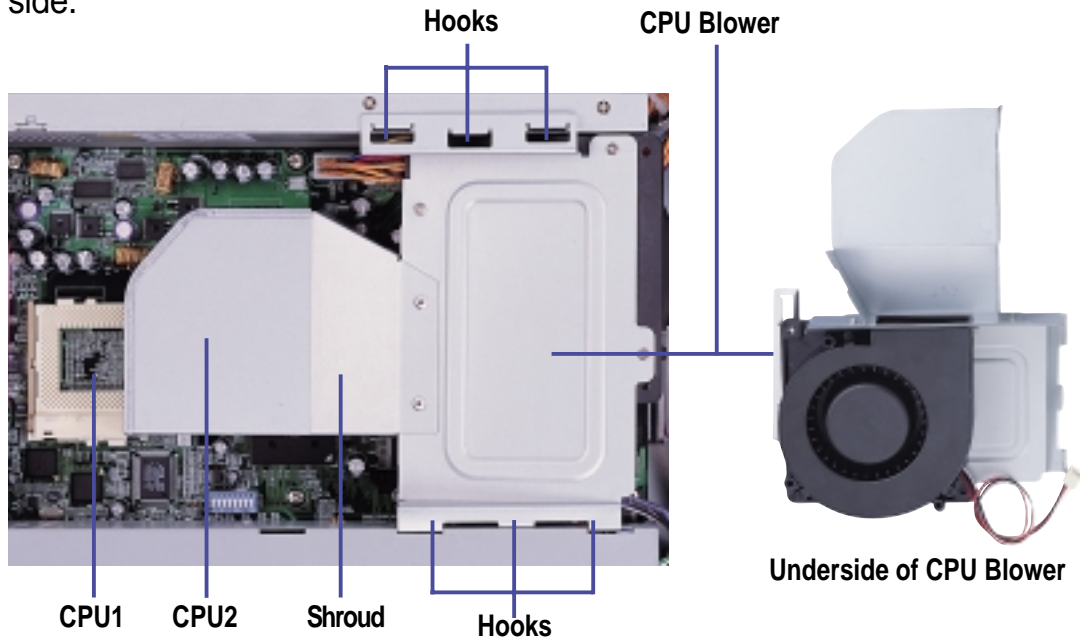
Expansion Card Fan

Besides the CPU blower, a cooling fan is mounted on the PCI cage to decrease the temperature of PCI cards. Fan/thermal failures can be monitored through the LEDs on the front panel and/or by optional software.
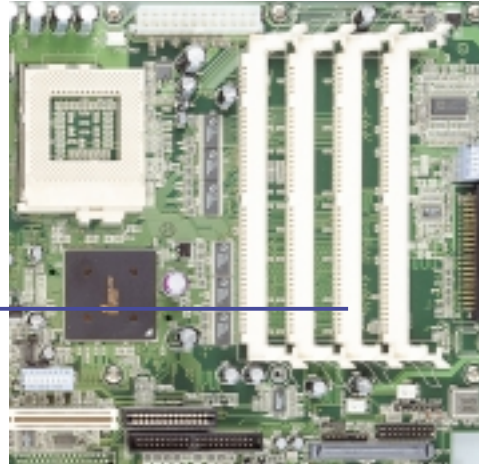

8cm PCI Cage Fan
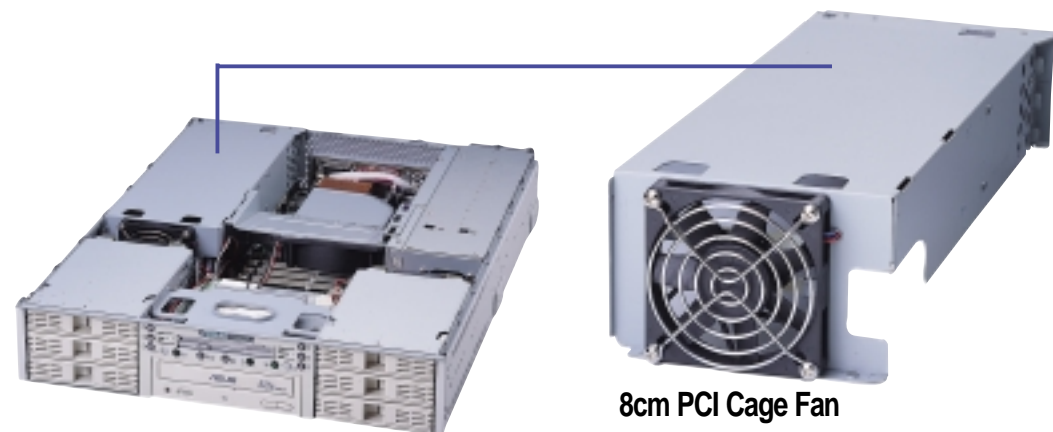
System Memor y

The motherboard has four Dual Inline Memory Module (DIMM) sockets that support 3.3V Synchronous Dynamic Random Access Memory (SDRAM) modules in 16, 32, 64, 128, 256, 512MB, or 1GB densities.

DIMM Sockets Location

Locate the DIMM sockets on the motherboard to install memory modules.
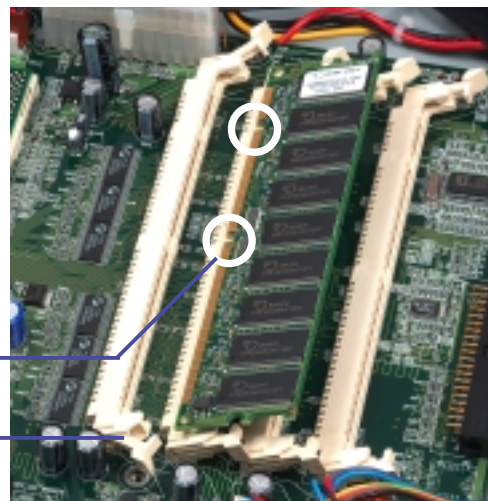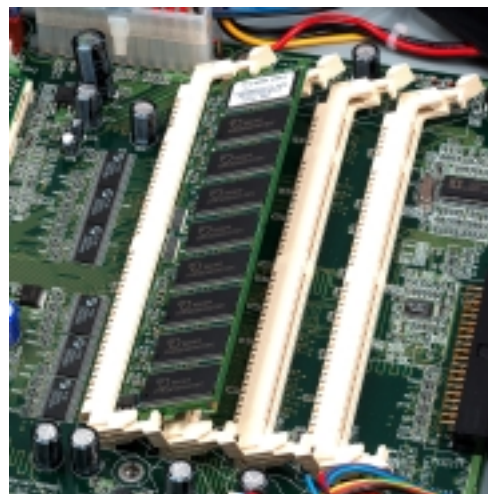
4 DIMM Sockets

DIMM Installation

(1) Unlock a DIMM socket by pressing the retaining clips outward. Align a DIMM on the socket such that the notches on the DIMM (indicated by white circles on the figure) match the breaks on the socket.

DIMM Notches

DIMM Socket Retaining Clip

(2) Carefully insert the DIMM on the socket until the retaining clips snap back in place.

CAUTION:

⚠ DIMMs fit in only direction. DO NOT force a DIMM into the socket to avoid damaging the DIMM.

Riser Card / Expansion Card

The motherboard has a 64-bit PCI expansion slot. The slot requires a PCI riser card to accommodate PCI expansion cards. The riser card comes mounted on the PCI cage.

Riser Card

The riser card inserts into the single PCI slot on the motherboard. The card has three 64-bit PCI card slots for PCI expansion cards.

PCI Cage

PCI Connector   PCI Card Connector

Mounted Riser
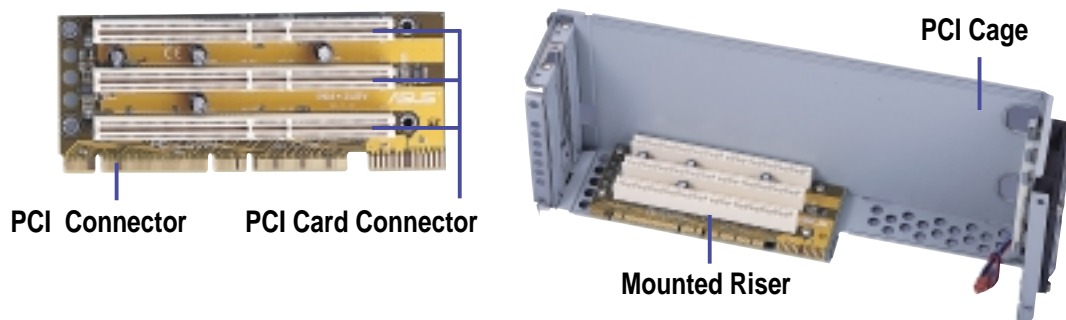
Installing an Expansion Card

Carefully insert the golden fingers of the PCI expansion card into the slot on the riser card. The PCI cage then installs on the chassis in such a way that will at the same time insert the golden fingers of the riser card into the PCI slot on the motherboard.

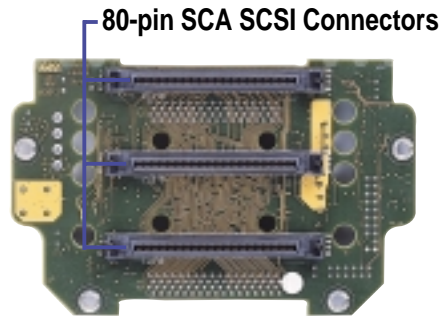Expansion Card

PCI Slot

Riser Card
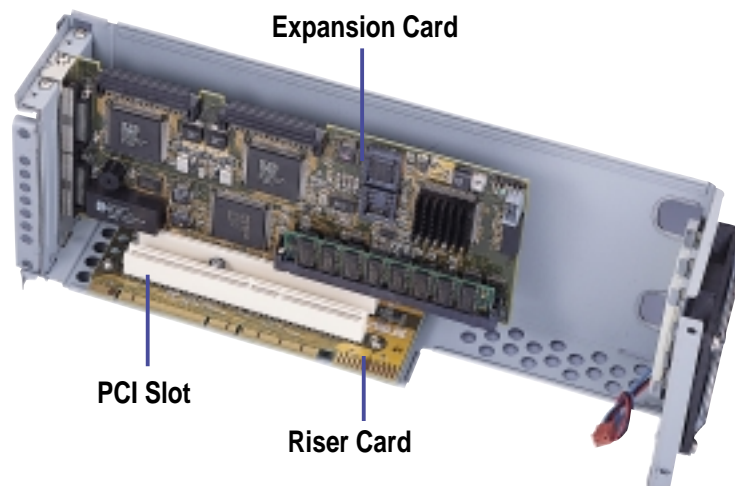
SCSI Backplane

The two SCSI backplane supports three Ultra160 SCA SCSI hard disks each for a total of six. The backplane design incorporates a hot-swap feature to allow easy connection or removal of SCA SCSI hard disks. The LED connector on the backplane connects to the front panel LEDs to indicate HDD access, HDD failure, thermal failure, and fan failure.
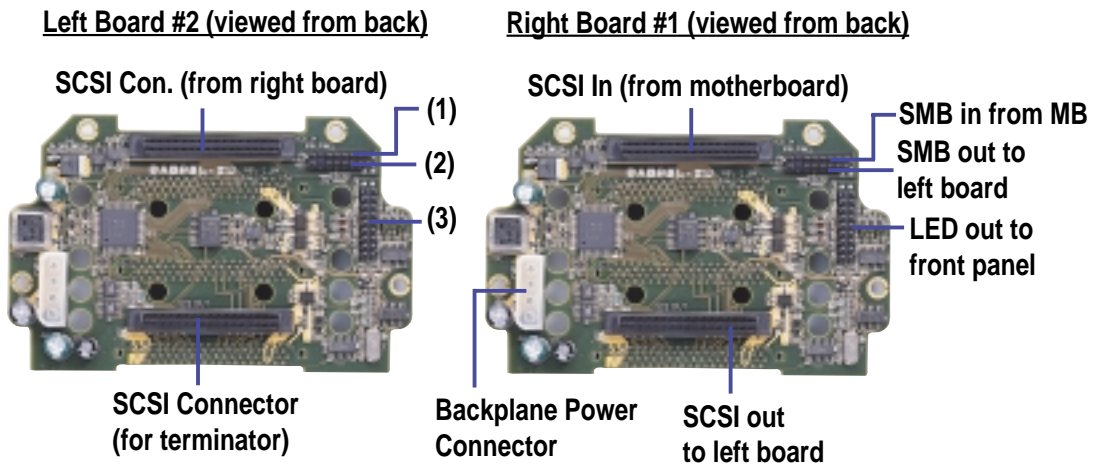
Front Side

The front side of the backplane has three 80-pin SCA SCSI connectors available for SCA SCSI hard disks. The hard disks are externally accessible from the front of the server.

80-pin SCA SCSI Connectors

Back Side

Each backplane includes power, SMB, LED, and SCSI connectors.

Left Board #2 (viewed from back)

SCSI Con. (from right board)

(1)
(2)
(3)

SCSI Connector
(for terminator)

Right Board #1 (viewed from back)

SCSI In (from motherboard)

SMB in from MB
SMB out to left board

LED out to front panel

Backplane Power Connector

SCSI out to left board

(1) SMB in from right board
(2) SMB out to power supply
(3) LED out to front panel

> **NOTE**
>
> The SCSI backplane is already installed in the system chassis. You do not need to remove the backplane when installing components or connecting cables.

Connecting Cables

SCSI Cable

Connect the 68-pin SCSI cable to the SCSI connector on the motherboard and the other end to the SCSI In connector on the backplane board.
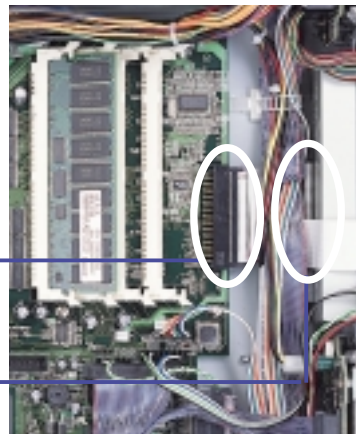
SCSI Connector on the Motherboard

SCSI Connector on the Backplane

IDE Cable

Connect the IDE cable directly to the CD-ROM drive connector.

Motherboard IDE Connector

CD-ROM IDE Connector

Floppy Cable

Connect the floppy cable directly to the floppy drive connector. The slim-type floppy drive uses a flat ribbon cable. It does not use the standard floppy drive cable.

Floppy Drive Connector

Motherboard Floppy Drive Connector

Connecting Cables

LED & SMB Cable

Connect one end of the LED cable to the PANEL2 connector on the motherboard and the other cable to the SMB connector.
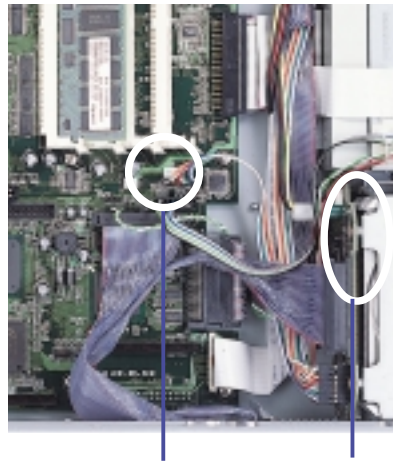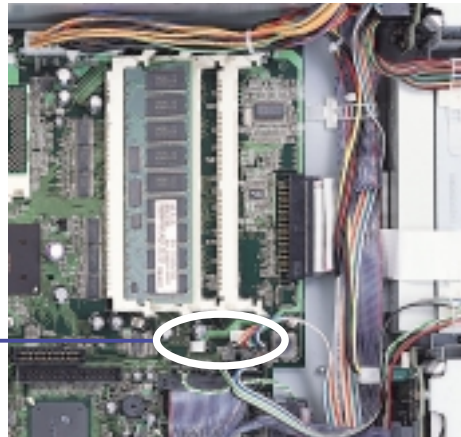

LED Connector on the Motherboard   **LED Connector on the Backplane**

Cooling Fan Cables

Connect the blower fan cable and PCI cage fan cable to the two chassis fan connectors on the motherboard.
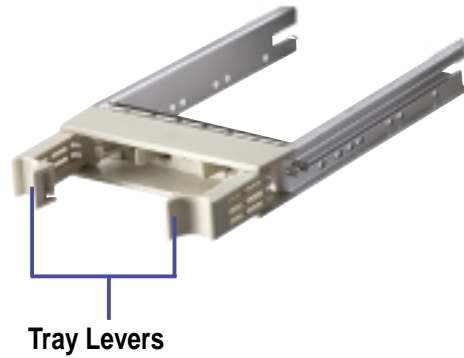
Chassis Fan Connectors ——

SCSI Hard Disk Drives

The system comes with three externally accessible SCA hard drive bays on each side to make a total of six.

Hot-Swap Drive Tray

In each of the HDD bays is a hot-swap tray for mounting a hard disk drive. Flip open the tray levers to release the tray, then slide the tray out of the chassis.

Tray Levers

SCSI HDD Mounting

Place the SCSI hard disk drive to the hot-swap tray and secure it with four screws as shown.

HDD Installation

After the drive is secured to the tray, carefully insert the drive into the bay, then push the levers back in place.

IMPORTANT

Make sure that the SCSI cable is connected to the motherboard and the backplane. Refer to the section "Connecting Cables".

SCSI Hard Disk Drives

Inserting or removing an SCA hard disk is very simple using the hot-swap trays.

Removing a Tray

(1) Flip tray levers out

(2) Pull tray out using both levers with both hands

Inserting a Tray

(1) Flip levers out

(2) Push on both levers with both hands
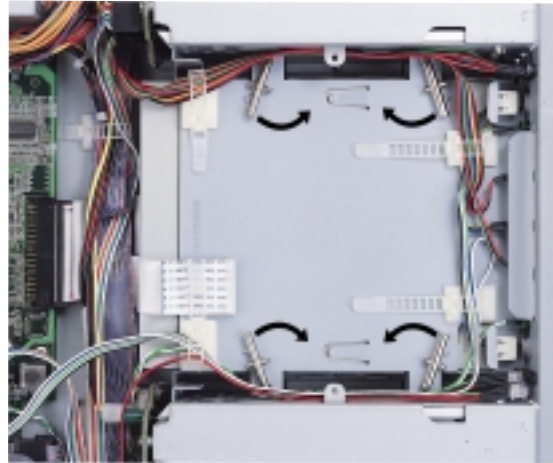
(3) Flip levers in until it snaps flush with the tray

CD-ROM Drive

CD-ROM Installation

Place the CD-ROM drive in its bay and slide it inward.

Secure the drive to the chassis with the four levers as indicated by the arrows. Connect the IDE and power cables to the CD-ROM.


Floppy Drive

The system comes with the floppy drive already installed. Refer to this section when you need to replace the floppy drive.

Floppy Drive Mounting

Mount the two brackets to the floppy drive and secure it with four screws and connect the white ribbon cable (compact version of the standard gray floppy drive cable). The white ribbon cable already includes power so there is no place for a separate floppy power connector.
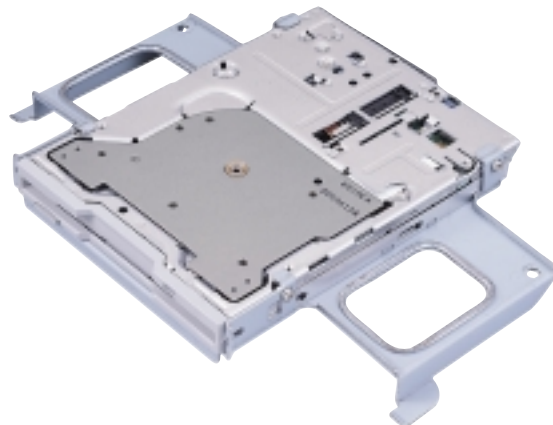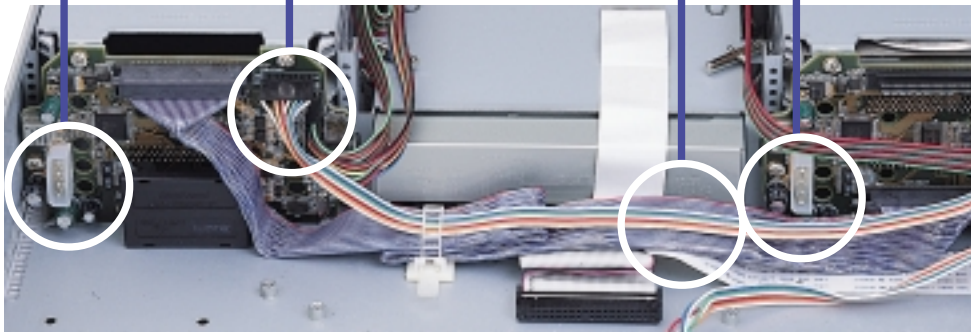
Power Supply Connections
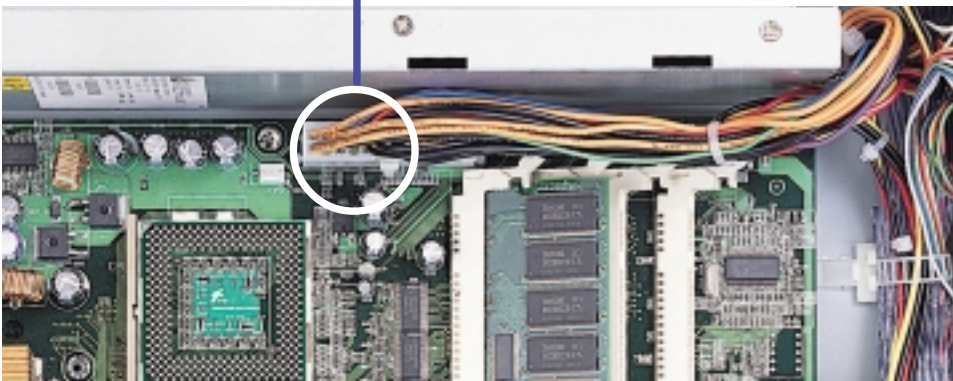
Power Supply Connection

The power supply unit contains redundant power supplies and a housing with five connectors. The connection locations are shown here.
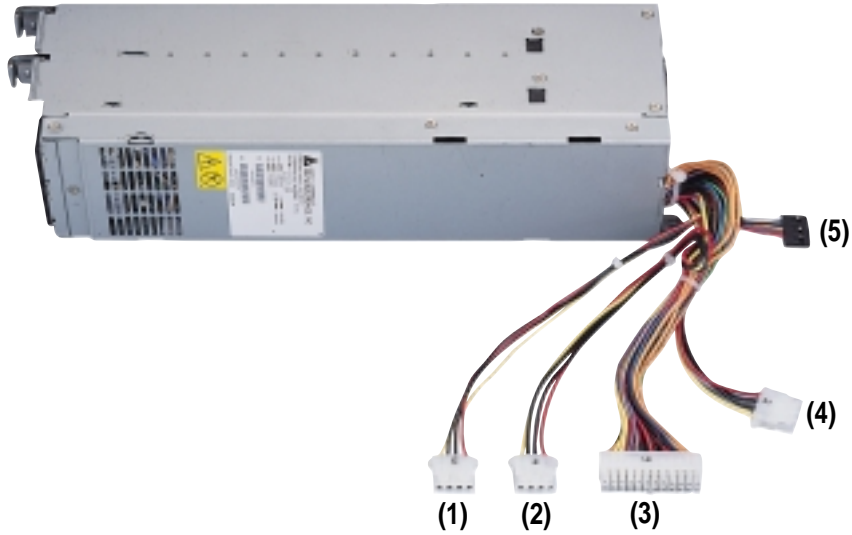
(4) Left SCSI Board   **(5) SMBUS (bottom)**   **(2) CD-ROM Drive**   **(1) Right SCSI Board**

(3) Motherboard Power Input

Power Supply Swapping

Power Supply Removal

The power supply is redundant and hot-swappable. Meaning that you can remove one module while the server is powered ON.

To remove a power supply module, squeeze the handle and push down to eject the individual power supply module. Then carefully pull out the power supply module.